personnel are alerted to the indication when the indicator means is activated and will collect a sample in response to activation of the indicator means.

15. A method according to claim **14**, additionally including timing the time between activation of the indicator means and collection of the sample.

16. A method according o claim **15**, additionally including printing a report indicating the time between activation of the indicator means and collection of the sample for the various sample collection times indicated. cuttings cut at a preselected desired well depth, comprising monitoring the depth of the well; calculating the expected volume of the well through which drilling fluid and drill cutting s carried thereby will flow upwardly from the bottom of the well to the surface of the well at various sensed depths of the well; calculated the expected volume of the well bore through which drilling fluid will flow downwardly from the surface of the well to the bottom of the well at the same various sensed depths of the well; calculating the volume of drilling fluid necessary to pump down the well to cause the drilling fluid at the bottom of the well at particular sensed depths of the well to be displaced and reach the surface of the well; monitoring the volume of drilling fluid pumped down the well; calculating at what depth drilling fluid reaching the surface of the well would have been injected into the well; comparing the depth at which drilling fluid reaching the surface of the well would have been injected into the well with predetermined depths at which samples should be collected; activating an indicator means when the depth at which drilling fluid reaching the surface of the well would have been injected into the well coincides with one of the predetermined depths at which sample collection is desired; and locating the indicator means so that well personnel are alerted to the indication when the indicator means is activated and will collect a sample in response to activation of the indicator means.

17. A method according to claim **14**, wherein the drilling fluid is pumped down the well to the bottom of the well during drilling by one of two or more available positive displacement piston pumps each of which pumps a known but different volume of drilling fluid with each stroke of the pump and each of which pumps may be used at any time during drilling, and wherein the step of monitoring the volume of drilling fluid pumped down the well includes the steps of determining which pump is operating at any particular time, and counting the number of strokes of the operating pump.

18. In a well drilling operation wherein a drilling fluid is pumped down the well to the bottom of the well during drilling of the well, wherein the fluid pumped down the well flows to the surface of the well carrying drill cuttings from the bottom of the well with it, and wherein well personnel are present at the well site during such drilling, an apparatus for determining when a sample of drill cuttings reaching the surface of the well should be collected to provide a sample of drill cuttings cut at a preselected desired well depth, comprising means for sensing the depth of the well; means for calculating the expected volume of the well through which drilling fluid and drill cuttings carried thereby will flow upwardly from the bottom of the well to the surface of the well at various sensed depths of the well; means for calculating the expected volume of the well bore through which drilling fluid will flow downwardly from the surface of the well to the bottom of the well at the same various sensed depths of the well; means for calculating the volume of drilling fluid necessary to pump down the well to cause the drilling fluid at the bottom of the well at particular sensed depths of the well to be displaced and to reach the surface of the well; means for sensing the volume of drilling fluid being pumped down the well during drilling of the well; means for relating the calculation of the volume of drilling fluid necessary to pump down the well to cause the drilling fluid at the bottom of the well at particular sensed depths to be displaced and reach the surface of the well with the sensed volume of drilling fluid being pumped down the well to identify the depth at which drill cuttings reaching the surface of the well were cut; and indicator means for indicating to well personnel when drill cuttings from a preselected well depth are arriving at the surface of the well and that a sample of such cuttings should be collected.

19. Apparatus for determining when a sample of drill cuttings should be collected according to claim **18**, wherein the drilling fluid is pumped down the well by a positive displacement piston pump which pumps a known volume of drilling fluid with each stroke of the pump, and wherein the means for sensing the volume of drilling fluid pumped down the well includes means to sense each stroke of the pump.

20. Apparatus for determining when a sample of drill cuttings should be collected according to claim **18**, wherein the drilling fluid is pumped down the well by one of two or more available positive displacement piston pumps each of which pumps a known but different volume of drilling fluid with each stroke of the pump and each of which may be used at any particular time, and wherein the means for sensing the volume of drilling fluid pumped down the well includes means to sense which of the pumps is operating and to sense each stroke of the operating pump.

21. Apparatus for determining when a sample of drill cuttings should be collected according to claim **18**, wherein the means for calculating the expected volume of the well, the means for calculating the expected volume of the well bore, the means for calculating the volume of drilling fluid and the means for relating the calculations is a computer programmed to perform as such means.

22. Apparatus for determining when a sample of drill cuttings should be collected according to claim **21**, wherein the means for sensing the depth of the well includes apparatus for producing an electrical signal for each preselected increment of depth the well is drilled and the computer additionally programmed to count the number of electrical signals received as an indication of well depth and wherein the means for sensing the volume of drilling fluid being pumped down the well during drilling includes apparatus for producing an electrical signal for each preselected increment of volume of fluid pumped down the well and the computer additionally programmed to count the number of electrical signals received as an indication of volume of drilling fluid pumped down the well.

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